Socio-spatial and temporal dimensions of transport equity for London's night time economy

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ABSTRACT

The sustainable mobility paradigm has dominated the urban transport research agenda for more than a decade. This paradigm focuses on the environmental impacts of travel and the imperative for climate change mitigation, however the specific outcomes of transport in terms of trip type and purpose are not robustly conceptualised, with limited intellectual foundations to understand the ethical considerations of transport service provision. This paper critically considers transport strategies recently developed for London's Night Time Economy, including policy discourse and technical approaches that shape of transport services provision at night. The case study evaluates the spatiotemporal dimensions of equity. Analysis of policy discourses revealed how night time transport are conceived as an instrumental means to grow the 'Night Time Economy', drawing from the conventional wisdom linking accessibility improvements with economic expansion. This strategy viewed 'London at night' as a vehicle for economic development, focusing on the consumption-side of the economy and improving individuals' access to entertainment and recreation. Policy discourse recognised the existence of night-time workers in sectors outside arts and recreation, however, attempts to broaden the 'Night Time Economy' agenda to accommodate the travel needs of night-time workers were lost through the narrow selection of accessibility metrics used in transport planning practice. This case demonstrates a missed opportunity to improve transport equity across spatial and temporal dimensions, as night-time workers face severe accessibility barriers, often relying on low-frequency bus services that have inadequate service coverage across Greater London. Scrutinising socio-spatial and temporal dimensions of transport provision can advance more systematic critical perspectives on transport equity by integrating a variety of distributional issues and linking more closely to the practical barriers faced by night-time workers to access transport.

1. Introduction

The sustainable mobility paradigm has dominated urban transport research for over a decade, eclipsing the traditional focus of transport planning and policy on travel-time minimisation (Banister, 2008). The shift to sustainable mobility has been slower to manifest in policymaking, as transport planning practitioners in many parts of the world continue to rely on outdated technical approaches promoting car dependency through a 'predict and provide' model of transport investment (Goulden et al., 2014; Jones, 2014). This discrepancy highlights how institutional responses to new policy objectives are mediated by the analytical tools used and their implicit assumptions. As we will argue in this paper, the same argument could be extended to the issue of socially equitable

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transport planning: despite accessibility planning having existed for some time, the uptake and use of such tools by practitioners has been limited (Papa et al., 2016).

Climate change mitigation and environmental sustainability are of paramount importance with respect to society at large, and sustainable transport strategies have an important, if not fundamental, role. However, for decarbonisation to be delivered in line with other broader sustainability objectives such as equity, inclusivity and justice, understanding the framing of transport policy around the diversity of user needs is crucial. In other words, current transport planning tools and approaches to sustainable transportation need to be critically evaluated against their inclusion (or exclusion) of different users' needs. Transport policy typically acknowledges transport infrastructure and services are essential to support urban quality of life, as highlighted by this quote from London's current Mayor, Sadiq Khan:

'Transport is a cornerstone of my vision for a fairer, greener, healthier and more prosperous city… Transport doesn't only shape our daily lives and determine how we get around London – it can create new opportunities for Londoners and shape the character of our city.' (TfL, 2017)

However, statements like this obscure inherent distributional issues and give little direction regarding the needs of different types of users, the types of opportunities that are created, and how tensions between environmental, social and economic goals are negotiated. To date, approaches to sustainable transport have frequently sidestepped the underlying political economy of transport provision. Given the fragmentation of critical perspectives and dispersal of knowledge supporting transport policy, there is a need to advance more systematic critical perspectives on transport (Kębłowski et al., 2016). Following the aims of this special issue to reconnect the sustainable transport research agenda with political-economic considerations, this paper examines the socio-spatial and temporal dimensions of transport equity and discusses how they can act to integrate critical perspectives. In turn, this can inform a more rigorous mode of operationalising transport equity through sustainable and just transport planning. This does not imply that spatiotemporal dimensions of transport obfuscate or displace existing critiques around socio-economic disparity, age, gender, disability or race, but rather provide useful empirical basis to consider these issues jointly. Since transport accessibility is a function of land-use patterns as well as transport service provision (Martens, 2015), making spatial dimensions explicit can usefully mobilise critical approaches by asserting the spatiality of equity and inequity (Soja, 2011). Going further to consider temporal dimensions highlights the time-critical nature of accessibility needs. The provision of transport services typically focuses on peak-hour travel, however, some social groups travel predominately during off-peak hours and are thus underserved by lower frequency services, with poor connectivity and longer travel times.

This paper centres on the recent introduction of Night Tube (London Underground) weekend services along selected routes to support the Night Time Economy (NTE). The plan to introduce the Night Tube was first announced by Transport for London (TfL) in 2013. The NTE policy agenda in London was initiated with the establishment of a Night Time Commission by Mayor Boris Johnson in 2016, which focused on the future of night-time venues. Over time, these two policy agendas combined, manifesting in the 24-hour vision for London, a policy strategy for London's NTE published in July 2017 under Mayor Sadiq Khan. Examining the strategy, appraisal and justification for the Night Tube allows for a critical contribution to transport studies that illuminates the embedded politics of a seemingly uncontroversial, progressive transport upgrade. Using a mixed methods approach, we provide both empirical evidence and theoretical reflection regarding the ways in which transport policy and planning for the night-time in London account for spatiotemporal differentiation of mobility needs.

2. Sustainable transport and the night-time city

2.1. Integrating issues of equity and social justice for sustainable transport planning

Sustainable transport has become the dominant paradigm shaping transport policy and technical practices. While this approach has been slow to proliferate throughout the world, and many regions continue to operate according to the neoclassical paradigm, sustainability has become a taken-for-granted concept in policy rhetoric and amongst the 'best practice' disseminated by international agencies (Gudmundsson, 2003). However, while this approach purports to address environmental and social problems through a configuration of technological, planning and design interventions, it tends to conceal the underlying political consequences of transport provision (Kębłowski et al., 2016). Politics infuses the design of transport strategies and investment decisions (be that investment location and or investment in different modes), which eventually influences who transport is planned for. Literature from critical geography unpacks the influence of political dynamics on public transport investment (Addie, 2013; Young and Keil, 2014) and calls for more attention to the social, political and economic relations underpinning transport provision (Schwanen, 2016). From these perspectives, ignoring the social impacts of transport provision, which arise at every level of decision-making, poses a large risk to social wellbeing and social justice (Jones and Lucas, 2012; Martens, 2016).

There is a growing body of empirical literature on the social impacts of transport infrastructure (Lucas, 2012; Lucas and Porter, 2016). However, in current sustainable transport policy strategies, 'transport disadvantages' are still poorly accounted for. As asserted by Hine and Mitchell (2001, p.319): 'transport policy has been shaped by the notion of a universal disembodied subject which has been aided by the reluctance of transport policy to include a social agenda to be addressed', and indeed, it is telling that minimising 'Generalised Travel Cost' (GTC) has for long been the primary objective within the traditional transport planning paradigm (Banister, 2008). Hine and Mitchell (2001, p.319) add that 'the creation of a barrier-free environment is important for equality of opportunity, yet transport disadvantages persist, particularly relating to issues of safety and accessibility for women (Law, 1999; Smith, 2008), children, older and disabled groups (Schmöcker et al., 2008) and deprived populations (Church et al., 2000; Welch, 2013) located

further away from employment clusters'. For instance, cycling is often purported to be the cornerstone of sustainable, multimodal transport strategies, but research has highlighted that the approach taken to develop cycling infrastructure in the United Kingdom is more likely to benefit young, educated, male populations than women and the elderly (Aldred et al., 2016).

Advancing a critical agenda for transport studies also holds potential to clarify questions about the fundamental purpose and distributional impacts of transport provision. This paper examines the socio-spatial and temporal dimensions of transport equity to inform this agenda. A first and crucial step is to develop a more nuanced understanding of transport accessibility. Most transport planning authorities only possess data on total traffic volumes and operational statistics for public transport systems. Thus, they rely on survey data to understand the needs, preferences, and motivations of different users, there is a high level of uncertainty around the ultimate impacts of transport provision in terms of economic activity and individual wellbeing. Providers seek to improve mobility and connectivity between locations that they deem important, with the aim of meeting societal needs. The uncertainty around the ultimate outcomes of transport provision (Bertolini, 2012) leaves potential for misalignment between the type and extent of transport services, and the actual needs of individuals. It further illustrates the need to unpack the values embedded in existing policy tools and metrics used for transport planning, instead of treating them as neutral instruments of policy-making. These instruments act as calculative devices, with them a wide range of assumptions about what should be measured and how (Callon and Law, 2005), what and whom is deemed worthy of being included (and what is left out) in the policy design process (Robin and Acuto, 2018).

2.2. Linking socio-spatial and temporal equity issues to transport planning: The case of the night-time economy

In what follows, we examine the socio-spatial and temporal dimensions of transport equity, focusing on transport improvements to improve night-time mobility. 24-hour and night-time strategies are increasingly popular among city governments worldwide, and some have strongly emphasised the expansion of public transport services at night. The night time economy presents a challenge to existing paradigms for transport planning and governance, due to the nature of nighttime economic activities and related transport needs. Security and safety issues are different at night, and both workers and consumers display different travel behaviours. The NTE first emerged as a concept describing a portion of night-time economic activity comprising entertainment, cultural activities and hospitality sectors in cities in the Global North (Bianchini, 1995; Shaw, 2010). In conjunction with policy trends seeking to reorganise urban centres around consumption activities, and imperatives for competition between cities to attract investment and people (Lovatt and O'Connor, 1995), the NTE acted as a 'boosterist representation of these activities as a means to regenerate inner city areas' (Talbot, 2007, p. 1). More recently, Shaw (2014) highlights that the initial intentions of this concept were much broader than the focus on the 'night-time high street' that it fostered (Hadfield et al., 2001), and argues for more comprehensive understandings of the urban night, beyond these specific consumption activities and related economic opportunities.

This paper takes a different perspective on the NTE than most literature published to date, as it focuses on NTE workers. While urban economic strategies for other sectors of the economy, such as knowledge-based services, focus directly on improving transport services for workers through transit upgrades (Chatman and Noland, 2014), the NTE policy discourse focuses heavily on transport for consumers in the NTE, with scant consideration of night-time workers. Since those working at night face distinctly different constraints and mobility needs than daytime workers, London's NTE transport strategy provides an appropriate case to critically scrutinise the socio-spatial and temporal dimensions of transport equity. Literature on time-space geographies has explored several lines of inquiry relevant to transport equity: Neutens et al. (2010) delineate between place-based accessibility measures defined by spatial separation, and people-based measures that consider individual space-time constraints and activities. Delafontaine et al. (2011) evaluate the impact of opening hours on space-time accessibility and found that individual time geographies differ across individuals. As a result, planning objectives to maximise overall accessibility across the population can be biased toward particular groups. This is starkly evident in many major urban transport systems, such as the London Underground, which provide the highest frequency of services for peak-hour travel in the morning and evening. Literature has also explored the temporal dimensions of mobility of groups with specific needs: the notion of 'juggling' characterises the travel behaviour and time-space constraints of adults in dual-earner households, and Schwanen and de Jong (2008) assess how these multiple constraints shape mobility and accessibility. Kwan (2013) also proposes a temporally-integrated accessibility analysis that incorporates racial segregation and environmental exposure. This body of literature elaborates on the diversity of accessibility and mobilities across individuals and social groups, and the different factors that shape these, however very limited attention is given to night time workers, even though they constitute a significant proportion of the workforce in many cities of the Global North and South.

Finally, literature has established positive links between greater equality and economic development, although there is limited evidence to support a causal relationship. Equity considerations set out explicitly to support justice and a fair society give grounds for this goal in itself, however we examine further whether equity considerations might also warrant inclusion within the conceived transport-economy relationship. In doing so we acknowledge that transport is a critical factor for participation in the labour market (Johansson et al., 2002), and there are often stark inequalities in the level and quality of transport accessibility across different areas of the city. Therefore, we contend that a critical agenda for transport studies should attend to this issue of access to employment, as an area of transport provision with significant political, social and economic implications. There is considerable literature and empirical research on social-spatial and temporal equity with regards to transport accessibility and mobilities, however scant consideration is given to these issues in literature on the relationship between the transport and the economy, especially at night, as it is set out by Banister (2008) for the sustainable mobility paradigm:

'Empirical research has concluded that the key parameters of the sustainable city are that it should be over 25,000 population (preferably over 50,000), with medium densities (over 40 persons per hectare), with mixed use developments, and with

preference given to developments in public transport accessible corridors and near to highly public transport accessible inter-changes (Banister, 2005; Banister, 2006)'

The expansion of economic activities in cities across the 24-hour cycle is relevant to broader reflections on transport sustainability, notably as it offers opportunities for re-organising freight activities at night to limit road congestion, or test innovative use of public transport infrastructure for moving goods and workers across large urban areas (Browne et al., 2012; McKinnon et al., 2015). Transport strategies for 24-hour cities remain largely understudied, especially in transport studies, hence our interest in unpacking their production. Highlighting possible oversights in current NTE strategies and discourses holds the potential to find opportunities for more user-friendly and equitable transport services. Our case looks into the highly-publicised Night Tube services introduced in London in 2017 and examines the implicit question: who is the Night (Tube) for? The realities of travelling at night in London are particularly harsh for shift-workers commuting in the early hours of the morning, as illustrated in popular non-fiction such as *This is London* (Judah, 2017). Macarie (2017) used ethnographic approaches to explore the impacts of night shifts among migrant workers in London, showing how night workers experience physical exhaustion, isolation and lack access to collective representation. In turn, this limits the ability of workers to advocate for a greater recognition of their rights and experiences in night time planning strategies. A recent report from the London Assembly (the elected scrutiny body of the Greater London Authority) highlighted that night-time workers often work in low paid jobs, and in particular, the report presented concerns with regard to these workers' access to "fair pay, a safe working environment, and access to safe transport options to and from work" (London Assembly, 2018, p. 6). Studies of night-time workers in other cities, such as Barcelona, show that women working at night suffer from the lack of direct transport to their workplace at night, in turn impacting on their safety and vulnerability within and outside of transport stations (Ortiz Escalante, 2017). Examining the production of London's night-time transport strategies is necessary to understand whether or not they cater for the need of night-time workers.

3. Material and methods

The case study evaluated in this paper considers the socio-spatial and temporal dimensions of transport equity for London's NTE. Our analysis proposes to explore the "work of framing" manifested in night-time economy discourses to question how London's night-time transport strategies attend to issues of socio-spatial disparities and inclusion. Policy frames integrate facts, causal processes and preferences and act to organise and interpret a complex reality, setting a frame to identify, analyse and respond (Rein and Schön, 2012). Critically, frames determine what is valid as evidence, and how it is interpreted to support decision-making and planning. Our analysis offers new insights about the ways in which the transport-economy relationship is framed in policy discourses, assessing whether or not this framing contributes to the design of transport strategies that explicitly account for equity.

In what follows, we suggest that various elements in policy discourses contribute to framing night time transport provision in a way that may result in policy interventions that exclude specific user groups (in this case, night time workers). Critical attention to policy discourse is important as we argue that policy interventions are shaped by conventional wisdom and institutional narratives about the purpose of transport policy is, and who it is for. The analytical approach developed by van Hulst and Yanow (2016) is adapted to elaborate on three dimensions of policy discourses: sense-making; selection, sorting and categorisation of phenomena; and storytelling. Sense-making is the rhetorical work of 'converting a problematic situation into a problem' (Schön and Rein, 1994) which allows various actors to eliminate uncertainty on a specific issue, converting it into a situation that can be acted upon through policy interventions. Sense-making occurs through interaction between different actors (e.g. elected officials, transport planners, user groups, transport workers, etc.) and requires identifying a problem and its boundaries, as well as potential desirable outcomes (Rein and Schön, 2012). Secondly, once a problem has been identified, it is necessary to select, categorise and sort relevant dimensions of that problem appears important to support the design of adapted interventions. This includes developing tools and metrics that identify, categorise and, more importantly, prioritise different aspects of the problem (van Hulst and Yanow, 2016). This work of identification, selection and prioritisation helps to design various policy interventions and allow policy-makers to choose among different options. Lastly, storytelling binds together the rhetorical work of sense-making, selecting, naming and categorising into a legible causal and shared narrative, it communicates 'what needs to be done - past, present, and future - corresponding to the plot line of a policy story' (van Hulst and Yanow, 2016, p. 100).

By articulating and critically evaluating the framing of the NTE for transport, we scrutinise the facts, values and causal relationships that are inferred through transport provision for the NTE. Our analysis is based on the review of three strategic documents in the London context: the Mayor's 24-Hour Vision: 'From good night to great night' (Greater London Authority, 2017a), the Mayor's Draft Transport Strategy (TfL, 2017a) and the Business Case for the Night Tube (Volterra Partners, 2014). These documents draw heavily from additional sources of evidence, including Impact of the Night Tube on London's Night-Time Economy (Volterra Partners, 2017), The Economic Value of London's 24-hour economy (Ernst and Young, 2016), Integrated Impact Assessment of the Consultation Draft Mayor's Transport Strategy 3 (Jacobs, 2017) and Draft Mayor's Transport Strategy Evidence Base: Challenges and Opportunities Report, and Outcomes Summary Report (TfL, 2017b). Publicly-available reports by TfL provided important contextual information on night-time travel trends and current planning tools.

The Mayor's 24-Hour Vision and Mayor's Draft Transport Strategy were coded thematically to extract all fragments of text related to the NTE, associated transport interventions, and considerations of equity and inequality. Coded text was subsequently analysed according to the three dimensions of framing articulated by van Hulst and Yanow (2016): Selecting, sorting and story-telling. Transport policy for London is accompanied by professional planning practices and tools that are critical to policy objectives into specific transport interventions.

While the Mayor's Draft Transport Strategy (TfL, 2017a) has significant shortcomings in relation to transport provision for night time users, we acknowledged that this document does not represent the full extent of transport policy and planning in London. Indeed, as a high-level policy document it is inevitably limited in detail, while more specific planning and implementation work is undertaken at TfL. However, public documentation on these more specific aspects of transport planning is not always available and our analysis is based on Greater London Authority documents. In what follows, we apply the analytical framework to evaluate night-time transport strategies in London, to unpack the multiple dimensions of the policy framing to better understand: (1) how transport policy is problematized in relation to the night time; (2) which tools are used to identify and prioritise relevant areas for policy interventions in relation to night-time transport planning; (3) how are those tools brought together into a coherent night-time narrative for London, and what does it tell us about the inclusion and exclusion of different types of users from current night-time transport planning strategies.

4. Assessing policy discourses of the night and sustainable transport strategies in London

4.1. Problematizing transport at night: Transport as a means to boost the night time economy

The Mayor's 24-Hour Vision identifies the key objective for London at night as the development of the NTE, reflecting how the economic potential of the night-time hours are prioritised, amidst the city's global ambitions to become a 'leader in the way we plan for life at night' and maintaining the vibrant nightlife as a 'mark of cultural status for a global city' (Greater London Authority, 2017a). The 'economy' in the NTE is understood predominately as constituted by leisure activities provided by cultural, entertainment and food sectors, i.e. the consumption opportunities provided by the economy, rather than the production side and (re)productive labour such as health and social care, transport and logistics, and retail. This conceptualisation of the NTE reiterates earlier approaches within urban policy that focus mostly on recreation and entertainment at night, improving consumption opportunities (Shaw, 2010, 2014). Transport provision for the NTE is framed in terms of overall connectivity improvements, with very limited mention of strategic planning to link travel demand at night with the services provided.

The Mayor's 24-Hour Vision for London sets out ten principles for the city's development. Table 1 summarises the consideration given to transport needs within this strategy, illustrating the NTE's strong bias toward providing transport services as a means to access consumption opportunities, and enhancing the value of specific locations within the city. This document does acknowledge that night-time workers in the NTE, however, instead of focusing on improved accessibility to employment, the strategy raises the need for workers to access shops and services outside typical working hours. While the strategy highlights the need for safe transport for night-time workers, it conceals existing inequalities in the provision and quality of transport services across spatial and temporal dimensions.

Initially, the focus of the Night-Time Commission established in 2016 was strictly on night-time venues. The 24-hour Vision broadens this agenda with minor references to the diversity within the NTE, highlighting that "*we can also do more for our vital nurses, police, freight and transport workers whose shifts go through the night*" (Greater London Authority, 2017a, p.6). However, this wider agenda was only partially incorporated into the Mayor's Draft Transport Strategy (TfL, 2017a). The Transport Strategy acknowledges that "*Londoners' travel habits are changing and off-peak, weekend and night-time public transport services also need to be better developed, enabling London to become a fully 24-hour city, with a strong night-time economy*" (p.126). Policy 17 of the Strategy states that "*the Mayor, through TfL and the boroughs, Network Rail and train operating companies, will seek the development of London's public transport services to support the growth of the night-time economy*" (p.185). While the transport strategy identifies the temporal changes in travel demand, it posits a direct link between the development of public transport services and growth of the NTE, without identifying what kind of trips transport provision is catering for.

Table 1
Attention to transport provision in Mayor's 24-Hour Vision for London (Greater London Authority, 2017a).

	Principle	Consideration of transport needs
1.	Be a global leader	'*We want London to be known as the most vibrant city on Earth … With a **growing creative population, great buildings, good transport at night and a positive agenda, we can achieve our ambition.**'*
2.	Provide vibrant opportunities for all Londoners, regardless of age, disability, gender, gender identity, race, religion, sexual orientation or means	'*To succeed, London's night time offer must be accessible, safe and attractive to all…. **Some people feel unsafe or find it difficult to get around at night. We have to understand the barriers to enjoying London at night.**'*
3.	Promote all forms of cultural, leisure, retail and service activity	'*Those employed in hospitals, call centres, transport or policing may work at any time of day or night. **Why should they only be able to access high street shops and services during day-time hours?**'*
4.	Promote the safety and wellbeing of residents, workers and visitors	'*We must protect night workers. **They have to be able to get to work and home safely.**'*
5.	Promote welcoming and accessible nightlife	'*Our centres at night should be places for everyone. People of all ages, abilities and backgrounds should be able to arrive by any form of transport, including walking and cycling.*'
6.	Become a 24-hour city that supports flexible lifestyles	'*London is already a 24-hour city and not just for culture and entertainment. Many businesses and organisations, like **those working in health, policing and security, hospitality, transport and financial services, must operate at night.**'*

MAP 1 – STRATEGIC CLUSTERS OF NIGHT TIME ACTIVITY

Strategic clusters of night time activity

- International importance
- Regional/sub-regional importance
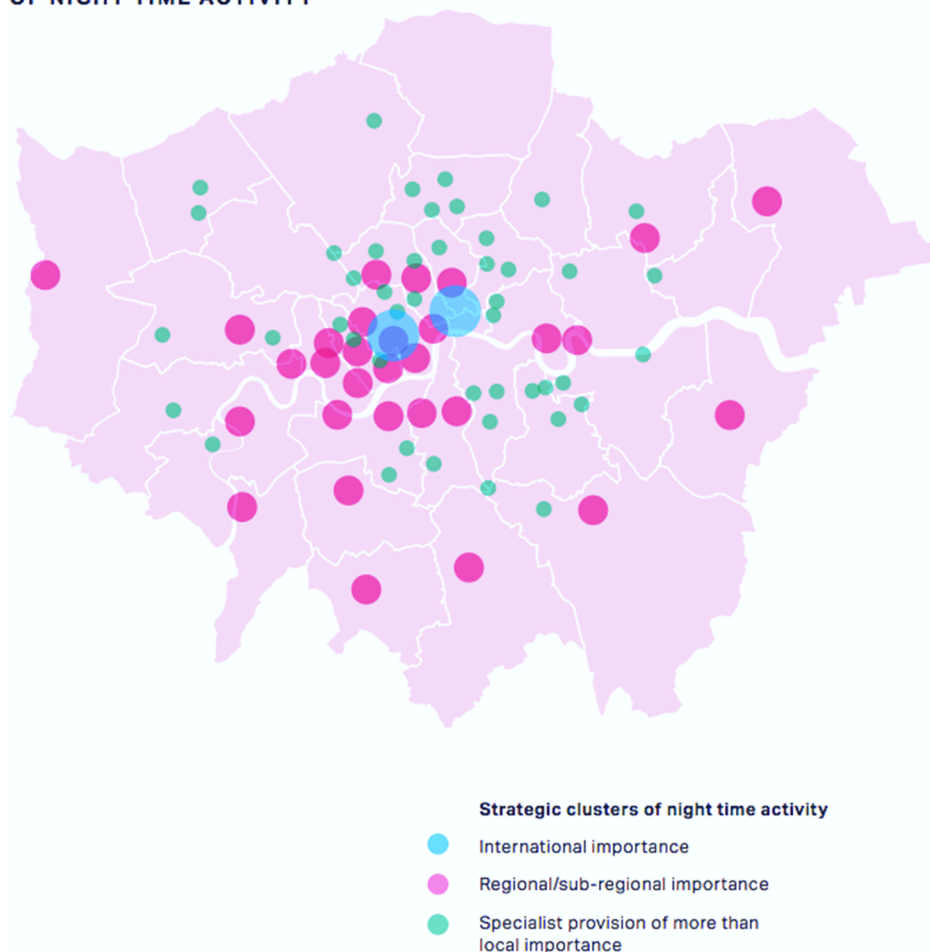- Specialist provision of more than local importance

Fig. 1. Strategic clusters of night time activity (Greater London Authority, 2017b, p. 68).

Inferring a direct causal link between improved accessibility and economic growth is common across many transport strategies: evidence for this effect at the local scale is significant, albeit highly variable and dependent on local contextual factors (Melia, in press). *Impact of the Night Tube on London's Night Time Economy*, a report prepared by Volterra Partners (2014) for TfL and London First (a business member group) sheds light on the framing of the Night Tube as the chosen policy option for night-time transport, providing details on both the internal business case prepared by TfL and the wider economic impacts estimated by Volterra. The report cites growth-boosting benefits including the estimated generation of 2000 permanent jobs supported by the Night Tube with "the net additional output produced as a result equates to an additional £360 m as a Present Value over 30 years, which would increase the BCR [benefit-cost ratio] to approximately 3.9:1" (Volterra, 2014, p.8), stating in addition that:

> "*The way that the Night Tube can really add to the scale of economic activity and money circulating in the economy is by making London a more attractive place to live, work and visit – so that more people and businesses locate and invest here, and more tourists visit*" (ibid., p.2).

In the documents analysed, transport infrastructure is framed as the key to expanding economic activity into the night-time hours. In line with the focus on consumption in the NTE, transport provision is framed as a question of ensuring access for consumers to the Central Activities Zone and other NTE 'hotspots'. Fig. 1 illustrates the strategic clusters of night time activity identified for the Greater London area, showing the local areas designated to be of international, national or local significance for London's NTE.

These clusters are determined on the basis of current or projected future growth in NTE-related activity, designated as part of strategic spatial planning for economic development in the 2010 London Plan, rather than any spatial analysis regarding current locations of night-time work as broadly defined (including productive sectors). Besides this spatial designation of London's centres and subcentres, there is very little focus on ensuring accessibility of locations (e.g. access to NTE employment clusters); instead, transport infrastructure is framed as an enabler of growth by improving general connectivity.

4.2. Analytical tools and policy interventions: Catering for night-time consumers

Van Hulst and Yanow (2016) identify the work that policy discourse does to select and categorize, and critical perspectives can unpack how policy frames highlight and conceal specific phenomena and processes. In the context of transport provision, the use of analytical tools and technical practices to operationalise transport policy has a significant bearing on the way that policy objectives are ordered and selected when new investments or upgrades are planned.

Proposed transport interventions to support the NTE focus on the extension Night Tube services to include more lines, and the introduction of night-time services on the Overground (2017–2020) and Docklands Light Rail services (2020–2030). Bus services are only mentioned briefly: "Night Bus services will be adjusted to complement night-time rail services and areas with a thriving night-time economy" (TfL, 2017, p.185). However, recent TfL plans to cut down bus services have been reported in the media and raised concerns about low-paid workers living in outer London's ability to access jobs in the central parts of the city (Walker, 2018). Current transport policy strategies have a strong focus on the extension of night-time rail services and contain no evidence indicating that alternative policy options – such as expansion of night-time buses – had been considered. The publicly-available evidence base (Volterra Partners, 2014) supporting night-time transport planning in London only presents analysis on the Night Tube.

There are two separate pieces of analysis presented in the report by Volterra Partners (2014). The first is TfL's internal business case analysis for the Night Tube, accompanied by Volterra's analysis of wider economic benefits. TfL's analysis combines a trip generation forecast generated through transport modelling, as well as an estimation of journey time savings, and the costing of these: "*TfL's modelling suggests that nearly 180,000 trips will be made on the Night Tube between 00:30 and 06:00… Those who switch from night bus to Night Tube are estimated to get an average time saving of 20 min*" (TfL, 2015, p.5), with the total value of these time savings being calculated as £481 million over 30 years. This use of 'Value of Travel Time' calculation founded on neoclassical transport economics to estimate the economic value of savings (Mackie et al., 2001) is reflective of the UK Department for Transport nation-wide WebTAG (Transport Assessment Guidance). The business case analysis estimates an average time saving of 20 min based on 13 origin-destination pairs and the assumption that transport users will and can switch from using night buses to the Night Tube along these routes. This approach falls in line with the standard way of presenting benefits for the 'general population' of transport users (Hine and Mitchell, 2001) and does not acknowledge how socio-economically and spatio-temporally differentiated needs shape travel behaviours and preferences. The report mentions night-time workers in stating that time saving benefits may be especially important to them, yet, in contrast to the modelling discussed above, specific analysis of benefits to workers is limited to two anecdotal quotes from employees in the food industry. These "improved commuter journeys for many people who work during the night-time in central London but live further out" are qualified as a wider, 'unquantifiable' impact (Volterra Partners, 2014, p.3) clearly not warranting deeper analysis.

Despite the stated aim of supporting night-time workers in London's NTE, neither policy strategies nor the Volterra report present evidence of accessibility analysis to address this concern.

The policy interventions and analytical tools that support London's NTE transport planning reveal the narrow way in which economic and social needs in relation to transport are understood by policy actors. As discussed above, so far, transport improvements to support the NTE policy agenda in London has focused only on the extension of rail transit services to operate on a 24-hour basis over the weekends (Greater London Authority, 2017a).

Considering the needs of low-paid night-time workers, it is crucial to consider that night bus services are heavily used by this group for commuting (TfL, 2017b). According to the TfL Bus User Survey, 51% of night bus passengers are travelling to and from work, and 57% of night bus passengers have an annual household income of less than £20,000 (TfL, 2014). According to 2012/13 figures, the mean annual household income in London is £51,770 (Greater London Authority, 2015), which also shows the extent to which night bus riders are economically disadvantaged. One reason for low-paid workers relying on night bus services may hence be public transport affordability: TfL rail fares are considerably more expensive than bus fares. The difference between the cost of an annual Bus and Tram Pass (£848) and an annual Zone 1–4 Travel Card (£1892) is equivalent to 5.2% of an annual household income of £20,000 (10.4% if assuming there are two commuters in the household). To reduce redundancy of transport provision along new Night Tube routes (and likely achieve cost savings to fund the operational costs of new services) London night buses are to be rationalised, with changes to routes and frequencies of many lines. The public consultation report for these changes reveals a significant number of concerns raised by respondents over affordability of switching from night buses to the Night Tube (TfL, 2016). The equity impacts of the current policy approach to investing in night-time rail, as opposed to night bus, provision are thus questionable, speaking to a long-standing academic and policy debate regarding bus versus rail investment as an issue of spatial justice in cities (Soja, 2010). Furthermore, *weekend* rail services are unlikely to significantly address the needs of low-paid night-time workers outside the nightlife or entertainment industries: night-time work in lower-paid sectors such as transport and logistics, health and social care and hospitality (including cleaning) is of course distributed throughout the week. The anecdotal evidence cited by the Volterra report regarding benefits of the Night Tube for night-time workers doesn't acknowledge this limitation: the benefits of the Night Tube can only accrue to individuals working weekend shifts.

These two observations suggest that the value of the Night Tube to low-paid night-time workers in London is questionable. The current policy discourse and investment approach illustrates the limited socio-spatial engagement of policy-makers with the differentiation of travel needs at night, as a significant proportion of London's night time workers are in fact working in health and social care, transport and retail, all of whom currently face limited travel options and long journey times for commuting. Fig. 2 illustrates the night bus and night tube network across Greater London (current at August 2018), including Night Tube and night bus routes, alongside new night bus routes operating on weekends to supplement the Night Tube. The map illustrates the incomplete coverage of the night-time transport network, and dominance of radial routes between the centre and periphery.

For night-time workers living in areas of Outer London with poor public transport accessibility at night, equitable transport provision is not only a question of connectivity, but also service quality and the journey experience. Night-time workers commuting to and from such areas via night bus during weekdays may also have to transfer between buses, or between bus and rail, which increases the monetary cost, journey time and discomfort of travel (Guo and Wilson, 2011, Paulley et al., 2006).

4.3. Policy narrative: entertainment, nightlife and creativity are the cornerstone of London's NTE

The discourse put forward in the London 24-hour Vision "From good night to great night: a vision for London as a 24-hour city" (Greater London Authority, 2017a) emphasises the importance of the creative and entertainment sectors in London's NTE. London's status as a global city is paramount, and developing the NTE to support higher quality culture and entertainment is viewed as a vehicle to maintain and enhance this status. The narrative points to a young, creative and vibrant night-life for Londoners and visitors. It should be noted that the vision recognizes the diversity of what constitutes the NTE in some instances, highlighting that "*we can also do more for our vital nurses, police, freight and transport workers whose shifts go through the night*" (Greater London Authority, 2017a, p.6). Yet, the concrete policy measures proposed as part of this strategy predominately relate to nightlife, pubs and clubs and connecting consumers to nightlife centres during the weekend. As shown in the previous sections, night-time transport planning has been problematised around the potential for generating increased economic activity; and the tools and policy instruments used to achieve this objective have been relatively insensitive to issues of equity and accessibility for night time workers. Similarly, the narrative adopted by the 24-hour vision stresses the importance of economic activities and businesses that support London's nightlife. The strategy also highlights need to create safer, more accessible spaces for people to keep consuming at night.

This imbalance is further reflected by the appointments made to the Night Time Commission, which does not include representatives from sectors such as healthcare: "*The vision will be realized by Night Czar Amy Lamé alongside the new Night Time Commission chaired by Philip Kolvin QC,*[1] *which will include planners, licensing experts, venue owners, artists, the police, media entrepreneurs as well as leaders of major cultural organizations*" (Greater London Authority, 2017a). Attention to the type of actors involved in strategy setting and policy discussions is needed to understand how issues are problematised, how specific policy instruments are chosen, and how common narratives are defined. The absence of organisations representing night-time workers is surprising, as data from the report produced by Ernst and Young (2016) show that across all sectors featuring a higher likelihood of night-time work, there are many more employees in transport and storage, health and social, and administrative sectors. Arts, entertainment and recreation are significant, but by no means the dominant sectors of London's NTE. As shown in Fig. 2 below, arts and entertainment only account for 6.4% of the employment in the NTE, and hotels, restaurants and bars for 13.4%.

For sectors such as health and social care, this asymmetry between the real nature of the NTE and the sectors and workers afforded the attention of policy-makers is stark. In responding to a call for evidence to inform this research, the Royal College of Nursing (RCN), a membership organization representing nurses and healthcare professionals across the UK, stated:

> "*The NTE is simultaneously reliant on the labour of health care workers, but as of yet, does not serve their needs adequately. Health care workers finishing shifts between 12am and 2am are left with a slimmer service, and for those requiring public transport into the outskirts of the city, it means extended waits, more changes and longer journeys... Higher housing costs and expensive travel... mean that more and more of the capital's health care professionals are being forced to spend increasing proportions of their wage on travel.*" (RCN, 2017)

Indeed, a 2015 survey of nursing staff in London showed that while rail services are heavily used by staff for the commute to work, 49% of staff also use bus services to get to work; furthermore, 7% of the average London nurse's pay is spent on transport (RCN, 2016). Yet, the voices of such sectors have, to date, not been included or discussed as part of London's formal governance structure for NTE policy-making (see Fig. 3).

5. Discussion and conclusions

The London case shows that emerging policy paradigms, in this case the NTE, pose new challenges to transport planning, especially for issues of equity. Time-space geography has made progress in developing a more nuanced understanding of mobilities and travel demands across time and space, illustrating how different social and temporal needs intersect. In this paper, we consider the socio-economic and spatio-temporal dimensions of equitable transport provision emerging from analysis of London's policy interest in the night, and the accompanying investment set out in policy strategies. As a growing number of cities around the world are attempting to leverage the opportunities of "24-hour city" planning (Van Liempt et al., 2014), the London example illustrates the oversights of current transport planning strategies and their limited capacity to support equity across socio-economic and spatio-temporal dimensions. By relying on approaches to transport planning drawing on neoclassical economics and the minimisation of Generalised Travel Cost, and identifying transport needs based on the location of nightlife hubs, the current paradigm neglects the perspectives and needs of those workers and sectors upon which the NTE depends. Mirroring the issues of implementing pedestrian zones in Brussels, London's Night Tube 'brackets questions of uneven development, gentrification, class politics and urban democracy' (Kębłowski et al., 2016, p. 4). Scrutinising the work done by policy frames reveals the apparent blindness of policy-making to the existing context of vast socio-spatial and temporal inequities in London's transport provision, alongside critical distributional

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[1] Who, at the time of writing, has been replaced by the CEO of the Association of Licensed Multiple Retailers as the new chair of the Night Time Commission.

Fig. 2. Night time transport provision.
Source: Authors. Tube and bus routes mapped from Transport for London data, retrieved August 25, 2018 from https://tfl.gov.uk/maps_/bus-spider-maps.
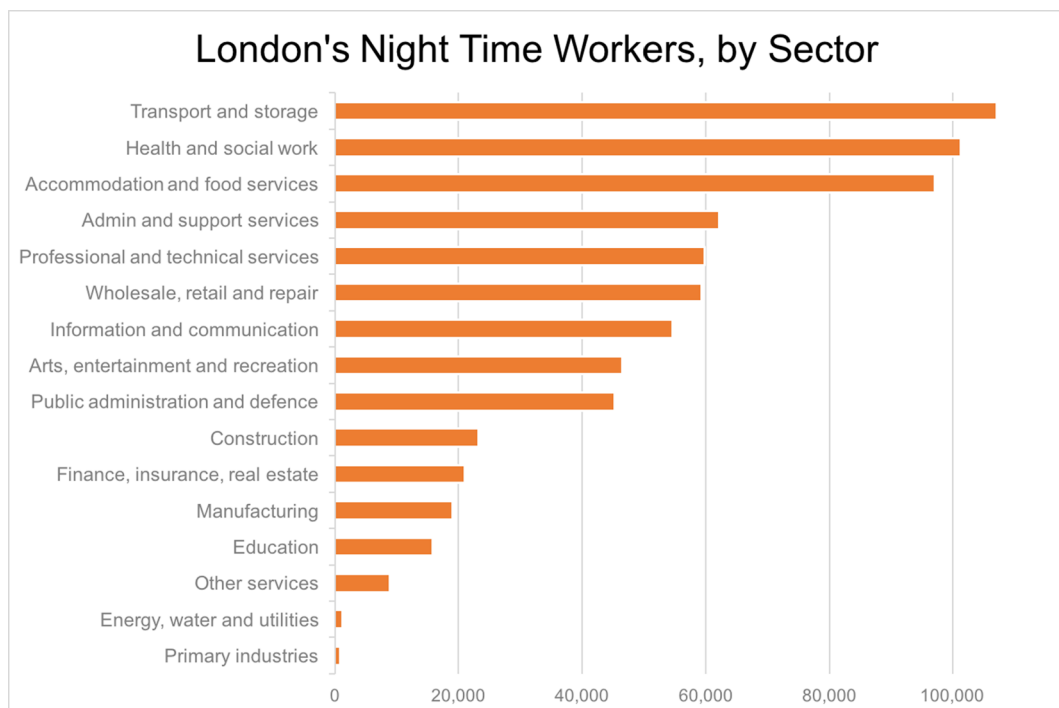

Fig. 3. London's night time workers, by sector (Ernst and Young, 2016).

impacts of the Night Tube, resulted in transport investments that unwittingly risk exacerbating these inequities. This policy approach thus continues to underprovide for night-time workers, while seeking to grow the night time economy. London's 24-hour Vision makes nominal commitments to address the needs of night-time workers, but the reality of planning for nocturnal transport highlights a clear emphasis on increasing the connectivity of night-life consumption hotspots (as highlighted in a recent report by the London Assembly, 2018). Temporal equity is a pivotal consideration for labour market accessibility, given that many transport systems provide the highest service quality and frequency for peak-hour travel, and tend to equate a smaller level of travel demand with lower levels of service provision. In light of the low-wage sectors in which many night workers are employed, workers' ability to shift from night bus services to the Night Tube is uncertain and the estimated benefits may obscure distributional impacts. The Night Tube disproportionately benefits night-time consumers and weekend night-time workers, who workplace in nightlife hotspots and who can afford to travell by tube. Furthermore, the London case analysed effectively illustrates how transport choices are heavily shaped by the type of institutions involved in defining transport issues, the tools used to assess and define priorities for transport planning, and global city narratives around the creative 24-hour city. This paper hopes to offer a valuable contribution to a re-politicised approach to transport studies by showing how deconstructing discursive framings of the NTE and associated transport interventions can help revive discussions on equity and spatial justice. In particular, it has shown that best practices and 'global city' visions put forward by local political coalitions alongside with one-sided transport options assessments contribute to obscuring the needs of less organised and less resourced groups, in this case low-paid night-time workers. Reflecting simultaneously on socio-economic, spatial and temporal aspects of transport equity, in terms of problem definition, creation and sorting of specific spatiotemporal categories, and narratives, illustrates both the politicisation of transport policy and the limited attention given to transport equity. Research for more inclusive transport planning strategies should therefore attend to the mobility needs of those who actively contribute to urban night-time economies, through quantitative, spatial and qualitative analysis revealing how differentiated access to transport is shaped by spatio-temporal and economic constraints.

Acknowledgements

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